



**Department of Mathematics, Statistics and Computer Science  
St. Francis Xavier University**

**Presents**

**Verification BDI Logic Properties of Workflows  
Modeled as Colored Petri Nets**

**by**

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**Wednesday, March 5<sup>th</sup> @ 2:15 in Ax23A**

Complex, distributed, interacting processes present many challenges including communication, coordination and reliability issues. Errors in such systems are particularly difficult to find. Formal methods verification, such as model checking, provide a means of, not only detecting errors but of proving the absence of errors. One application area of such systems is health care. An example is hospice palliative care which involves many different health care practitioners, volunteers and family members. There are many views of the ongoing care process, which involves repetitive tasks such as patient assessment and treatment administration. Errors can be costly, in terms of lives, quality of life, and/or dollars.

Workflows management systems (WfMSs) decrease errors by allowing visualization, analysis, and automation of processes. Such systems are sufficient for established, well-defined activities such as manufacturing or processing insurance claims. However, most systems lack the flexibility to adapt to a changing environment in which not all information is known in advance, e.g., hospice palliative care. WfMSs are generally limited to basic structural analysis such as the option to complete. Patient centered care requires not only that the processes are completed but that the processes are in compliance with the patient's wishes. Standard workflow modeling languages are not equipped to handle such requirements. Many popular languages are based on the Petri formalism, and various extensions such as time and color, have been shown to adequately capture common workflow patterns for the control flow, data, resource, and exception handling perspectives of processes. I am investigating the feasibility of enriching colored Petri nets with a logic of Beliefs, Desires, and Intentions (BDI).

I will develop and implement model checker that will automatically verify properties of a BDI enriched, colored Petri net model. This will involve the use of a property specification language with modalities for agent knowledge and belief as well as temporal modalities. For example, the model checker should be able to verify that "at all times, a prescribed treatment is eventually implemented unless it violates a patient's desires".

**Refreshments will be served before the talk in AX24A**